

PHASE TRANSITION EXAM CARDS AND EXAM PEN DESIGN

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ABSTRACT: In nowadays, optical mark recognition technology is used in most countries to check the answers and calculate the grades. It is achieved by using the carbon pen to mark the answer cards. It is hard to use the same force to mark every forms. When the force is too small, the optical mark scanner can't recognize the answer. On the contrary, when the force is too hard, the answer can't be cleaned completely and that may cause some recognizing problems to the scanner. Although manual checking is still exist, it is only used to the answer cards which is marked by zero by the scanner. This research will use a new method to avoid problems caused by the color difference and invalid erasing. To improve the answer method, this research adopted phase transition material to the answer card and developed a temperature control pen to mark the answer card. This phase transition material changes its color as temperature changes, so the mark on the answer cards can be cleaned by the temperature control pen completely. In addition, this kind of marking method did not have the problem caused by the color shade. In consequence, with this optical recognition technology, the probability of misjudgment can be reduced significantly.

Keywords: phase transition material, exam cards, cooling system.